TO: John Sharkey
FROM: Richard Szymarek
SUBJECT: Well Sealing

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The requirements for sealing of water supply wells in Washington are in WAC 173-160-231; 241; 251; 261; and 271. None of these sections refer to the use of a drive shoe as a means of sealing a well. Washington does allow the use of bentonite, bentonite slurry, neat cement, neat cement grout, and cement for sealing. We also allow the driller some flexibility in choosing how they will seal a well. That is, they are provided a standard to meet and they choose how to meet that standard. An example might be to drill, drive, and seal to cause a watertight seal. See 3(a). The following is a summary of Washington well sealing requirements.

- WAC 173-160-231 – What are the standards for surface seals?

This section requires that every well have a surface seal. Except for hand dug, jetted, dewatering, and drive points wells, all surface seals must be eighteen feet deep. The sealing material is required to be placed in an annular space that is four inches larger than the permanent casing.

- WAC 173-160-241 – What are the requirements for formation sealing?

This section describes how wells are to be sealed in unconsolidated and consolidated formations.

1. Wells completed in unconsolidated formations without clay beds use the sealing requirements of section 173-160-231.
2. Wells in unconsolidated formations with clay bed at least six feet thick are sealed in one of two ways.
   (a) A drill hole at least four inches larger than the permanent casing extends from land surface into the clay bed or other confining layer directly above the developed aquifer. The annular space is filled with sealing material by either pumping or tremmying. OR
   (b) An upper drill hole at least four inches larger than the permanent casing extends from land surface to a minimum of eighteen feet. The annular space in the upper drill hole is to be kept at least half full of sealing material while casing is being advanced.
3. Wells completed in consolidated formations are sealed in one of two ways.
   (a) An upper drill hole at least four inches larger than the permanent casing extends from land surface into the sound and unfractured formation. The permanent casing is driven and sealed into the consolidated formation in a manner that establishes a water tight seal. This is what I refer to as a performance measure. That is, we let the driller determine how far to drill, case, and seal into

the rock. If the steps they take result in a leak, they fail the sealing aspect. If the driller pumps the seal from the bottom of the casing, the annular space may be reduced to two inches. OR
(b) An upper drill hole at least four inches larger than the permanent casing extends from land surface to a minimum of eighteen feet. The annular space in the upper drill hole is to be kept at least half full of sealing material while casing is being advanced. Again the casing is to be driven and sealed into the formation, resulting in a watertight seal.

- WAC 173-160-251- What are the special sealing standards for artesian wells?

This section requires that the well casing be sealed into the confining stratum overlying the artesian zone. The seal shall prevent surface and subsurface leakage. Again if it leaks, they fail. This section also requires the driller to have a sealing plan prior to drilling.

- WAC 173-160-261- How do I seal a dug well?

The seal in a hand dug well is required to extend from the casing out to undisturbed soil. The depth of the seal depends on the depth of the well.

- WAC 173-160-271 – What are the special sealing standards for driven wells, jetted wells, and dewatering wells.

Driven and jetted wells have a sealing depth requirement of six feet from land surface by four inches greater than the casing diameter. Dewatering wells that are in place less than twelve months have a sealing requirement of three feet by four inches larger than the permanent casing. Dewatering wells that are in place longer than twelve months and that are less than twenty-one feet deep are sealed to within three feet of the bottom of the casing. All other dewatering wells have an eighteen foot seal.